

5 Pilot Comparative Evaluation of Remedial Alternatives

In addition to its strict SEPA regulatory role, this EIS also evaluates each of the eight FS alternatives and the SEPA No Action alternative for its consistency with the seven goals of the Bellingham Bay Demonstration Pilot. Consistency with these goals is not required under MTCA or SMS regulations. However, the Pilot Goals capture the results of over ten years of coordinated cleanup, source control and habitat restoration planning in Bellingham Bay. Alternatives that have a high degree of consistency with the Pilot goals are considered to provide greater overall benefits relative to the stated priorities of the Pilot team members.

The Pilot analysis of alternatives summarized in this Section is different from MTCA or SEPA in that it is not required under existing regulatory authorities. Consistency with the Pilot Comprehensive Strategy and the Pilot Goals is voluntary. However, the use of the Pilot goals provides an additional basis by which the qualitative benefits or short-comings of a remedial alternative can be measured.

5.1 Seven Baywide Pilot Goals

As described in Section 2.2 of this document, the Bellingham Bay Demonstration Pilot was established in 1996 with the stated mission to use a new cooperative approach to expedite source control, sediment cleanup and associated habitat restoration in Bellingham Bay. The Pilot Team included regulatory and resource agencies, the City of Bellingham, the Port of Bellingham, the Lummi Nation, the Nooksack Tribe and other key community groups and stakeholders. The Pilot included an unprecedented level of community involvement and public outreach activities.

Using consensus-based decision-making, the Pilot Team established seven “baywide” goals that it wanted to ultimately achieve. The goals were formally adopted by the multi-agency work group in 1997. The seven Pilot goals are as follows:

Goal 1 -- Human Health and Safety: Implement actions that will enhance the protection of human health.

Goal 2 – Ecological Health: Implement actions that will protect and improve the ecological health of the bay.

Goal 3 – Protect and Restore Ecosystems: Implement actions that will protect, restore or enhance habitat components making up the bay’s ecosystem.

Goal 4 – Social and Cultural Uses: *Implement actions that are consistent with or enhance cultural and social uses in the bay and surrounding vicinity.*

Goal 5 – Resource Management: *Maximize material re-use in implementing sediment cleanup actions, minimize the use of non-renewable resources, and take advantage of existing infrastructure where possible instead of creating new infrastructure.*

Goal 6 – Faster, Better, Cheaper: *Implement actions that are more expedient and more cost-effective, through approaches that achieve multiple objectives.*

Goal 7 – Economic Vitality: *Implement actions that enhance water-dependent uses of shoreline property.*

5.2 Pilot Evaluation of Alternatives

Table 5-1 summarizes the results of the comparative evaluation and ranking of the remedial alternatives performed using the seven “baywide” Pilot goals. As shown in Table 5-1, each of the alternatives was qualitatively ranked under each of the seven goals based on the ability of the alternative to further that goal. Qualitative rankings were applied as either “Low,” “Medium,” or “High.” A “high” ranking indicates that the alternative provides better progress toward that Pilot goal than other alternatives ranked as “Low,” or “Medium.”

The following discussion presents the composite Pilot rankings for each of the eight RI/FS alternatives and the No Action Alternative, along with a summary of key differences among the alternatives.

With the exception of Goals 1, 2, and 6 the Pilot rankings of the alternatives are developed independent of the MTCA rankings performed in the FS Report. In the FS Report, the alternatives are evaluated against MTCA criteria, and preferred cleanup alternatives are identified using a disproportionate cost analysis (refer to Section 7.3 of the FS Report). That analysis defines the extent of active remedial measures that are considered “permanent to the maximum extent practicable” as defined under MTCA. The analysis of environmental protectiveness performed in this document using Pilot Goals 1 and 2 (Human Health and Safety, and Ecological Health) incorporates the output of the MTCA analysis, and the analysis of Goal 6 (Faster, Better, Cheaper) considers the analysis of disproportionate costs as one element of the evaluation. Refer to Section 7 of the FS Report for additional information regarding the MTCA analysis of remedial alternatives.

5.2.1 No Action Alternative

Pilot rankings for the No Action Alternative are summarized in Table 5-1. The overall Pilot ranking for the No Action Alternative is low, based on the average of the seven individual rankings. Individual rankings are discussed below:

- **Goals 1 & 2 (Human Health & Safety & Ecological Health):** The No Action Alternative ranked low for Goal 1 and Goal 2. The No Action Alternative does not ensure compliance with MTCA cleanup levels protective of human health and the environment. Therefore, low rankings are applicable.
- **Goal 3 (Habitat Protection & Restoration):** The No Action Alternative was ranked low under Goal 3. Under the No Action Alternative, shallow-water habitat areas at the head and along the sides of the Inner Whatcom Waterway would not be disturbed by dredging or other remediation measures. This lack of disturbance provides a habitat benefit in the short term. However, this habitat benefit is offset by the lack of environmental protectiveness of the alternative. Further, the alternative does not provide any long-term protection of the habitat areas, nor does it actively restore or enhance habitat in other areas, as in other project alternatives. For these reasons, the low ranking is appropriate.
- **Goal 4 (Social & Cultural Uses):** The No Action Alternative receives a low ranking for Goal 4, because the Alternative does not support revitalization of the Bellingham Waterfront. Under the No Action Alternative, environmental effects of impacted sediments will continue, and liability uncertainty will hamper potential navigation or land use improvements within and in waterfront areas of the site.
- **Goal 5 (Resource Management):** The No Action Alternative ranks low for Goal 5. In theory the No Action Alternative represents a significant cost savings relative to the costs of the remedial alternatives, and conserves resources by not taking action. However, the No Action alternative does not achieve site cleanup, does not support planned land and navigation uses, and will encumber the use of existing properties and waterfront infrastructure. These “hidden” costs are significant for the No Action Alternative, and justify the low ranking of this Alternative.
- **Goal 6 (Faster, Better, Cheaper):** As with Goal 5, the No Action Alternative receives a low ranking under the Faster, Better Cheaper Goal. Though the alternative provides short-term cost savings over the other more costly alternatives, the No Action Alternative does not address environmental protection, and does not address the long-term

waterfront land and navigation uses. While the No Action Alternative is “cheap” it is clearly not “better” with respect to environmental protection, habitat or land use benefits. Costs of mitigating the adverse impacts of the No Action Alternative would be substantial. These mitigation costs justify additional cleanup actions even if Goal 6 is viewed in isolation from the other Pilot Goals.

- **Goal 7 (Economic Vitality, Shoreline Land Use):** Under Goal 7 the No Action Alternative receives a low ranking, because the alternative is not consistent with planned land or navigation uses for either the Whatcom Waterway or the ASB area. The Alternative would adversely affect the economic vitality of the Bellingham Waterfront area, and would adversely affect future shoreline land use.

5.2.2 Alternative 1

Alternative 1 rankings are summarized in Table 5-1. The overall Pilot ranking for Alternative 1 is low, based on the average of the seven individual rankings. Individual rankings are discussed below:

- **Goals 1 & 2 (Human Health & Safety & Ecological Health):** Alternative 1 received a low composite ranking under the Pilot evaluation. The Alternative ranked medium for Goal 1 (human health & safety) and Goal 2 (ecological health). Though the cleanup is expected to comply with MTCA cleanup levels protective of human health and the environment, the alternative does not conduct cleanup using solutions considered to be permanent to the maximum extent practicable under MTCA. Therefore, Alternative 1 does not receive a high ranking under these two goals.
- **Goal 3 (Habitat Protection & Restoration):** Alternative 1 was ranked medium under Goal 3. Under Alternative 1, shallow-water habitat areas are preserved at the head and along the sides of the Inner Whatcom Waterway, and capping produces a beneficial change in sediment elevation and energy levels in the area offshore of the ASB. However, the alternative does not facilitate the removal of Inner Whatcom Waterway bulkheads or over-water structures as in Alternatives 5 and 6, nor does it achieve restoration of aquatic uses for the ASB as in Alternatives 5 through 8.
- **Goal 4 (Social & Cultural Uses):** Alternative 1 receives low rankings for Goal 4, because the dredging plan for the Inner Whatcom Waterway is not consistent with land use and navigation planning for this area, and the capping of the ASB is inconsistent with planned aquatic reuse of the ASB.
- **Goal 5 (Resource Management):** Alternative 1 ranks low for Goal 5. Alternative 1 conserves resources by minimizing construction activity.

However, Alternative 1 impedes the continued use of the existing deep draft navigation infrastructure present at the Bellingham Shipping Terminal.

- **Goal 6 (Faster, Better, Cheaper):** For Goal 6 Alternative 1 receives a low ranking. Though the alternative provides short-term cost savings over the other more costly alternatives, Alternative 1 does not address planned waterfront land and navigation uses. Therefore, this alternative is cheaper, but is not necessarily better.
- **Goal 7 (Economic Vitality, Shoreline Land Use):** Under Goal 7 Alternative 1 receives a low ranking, because the alternative is not consistent with planned land or navigation uses for either the Whatcom Waterway or the ASB area. The relatively long restoration time for this Alternative will also hinder community redevelopment activities in waterfront areas.

5.2.3 Alternative 2

Alternative 2 rankings are summarized in Table 5-1. The overall Pilot ranking for Alternative 2 is medium, based on the average of the seven individual rankings. Individual rankings are discussed below:

- **Goals 1 & 2 (Human Health & Safety, Ecological Health):** Alternative 2 ranked medium for Goal 1 and Goal 2. Though the cleanup is expected to comply with MTCA cleanup levels protective of human health and the environment, the alternative does not conduct cleanup using solutions considered to be permanent to the maximum extent practicable under MTCA. Therefore, Alternative 2 does not receive a high ranking under these two goals.
- **Goal 3 (Habitat Protection & Restoration):** Alternative 2 receives a high ranking under Goal 3. Alternative 2 produces negative habitat impacts in the Inner Whatcom Waterway, through the removal of emergent shallow-water habitat from the head and sides of the waterway, and the triggering of shoreline infrastructure requirements that further affect habitat quality in the Inner Whatcom Waterway. The Alternative does not restore aquatic habitat within the ASB. However, Alternative 2 creates new premium shallow-water aquatic habitat at the Cornwall CAD facility, offsetting other habitat losses and providing an anticipated net gain of nearshore habitat. The high ranking under Goal 3 is based on this anticipated net gain in nearshore habitat for Alternative 2.
- **Goal 4 (Social & Cultural Uses):** Alternative 2 receives a low ranking under Goal 4 (social and cultural uses) because the dredging plan for the Inner Whatcom Waterway is not consistent with planned mixed-use redevelopment of this area, and because the alternative triggers

shoreline infrastructure requirements that are in conflict with area land use and navigation plans. The deep dredging performed under this alternative results in potential disturbance to cultural or historical resources in the former Citizen's Dock area at the head of Whatcom Waterway. Alternative 2 also does not support planned aquatic reuse of the ASB.

- **Goal 5 (Resource Management):** Alternative 2 receives a medium ranking under Goal 5. Alternative 2 minimizes the use of non-renewable fuel resources required to transport dredged materials off of the waterfront. However, Alternative 2 triggers the creation of new infrastructure that will be costly to create, will produce redundancies with the existing infrastructure present at the Bellingham Shipping Terminal, and will be in conflict with community land use plans for the Inner Whatcom Waterway.
- **Goal 6 (Faster, Better, Cheaper):** Alternative 2 receives a medium ranking under Goal 6. While the costs of the alternative are lower than those of Alternatives 5 and 6, this cost-effectiveness is eliminated after the costs of additional shoreline infrastructure requirements are taken into account. Further, the alternative does not capture new funding sources (i.e., marina revenues) which the Port plans to apply to offset a portion of the cleanup costs for the ASB area under Alternatives 5 through 8.
- **Goal 7 (Economic Vitality, Shoreline Land Use):** Under Goal 7 Alternative 2 receives a low ranking, because the alternative is inconsistent with planned land or navigation uses for either the Whatcom Waterway or the ASB area.

5.2.4 Alternative 3

Alternative 3 rankings are summarized in Table 5-1. The overall Pilot ranking for Alternative 3 is medium, based on the average of the seven individual rankings. Individual rankings are discussed below:

- **Goals 1 & 2 (Human Health & Safety & Ecological Health):** Alternative 3 ranks medium for Goals 1 and 2. The cleanup is expected to comply with MTCA cleanup levels protective of human health and the environment, but the alternative does not conduct cleanup using solutions considered to be permanent to the maximum extent practicable under MTCA.
- **Goal 3 (Habitat Protection & Restoration):** Alternative 3 receives a low ranking under Goal 3. Alternative 3 produces negative habitat impacts in the Inner Whatcom Waterway, through the removal of emergent shallow-water habitat from the head and sides of the waterway, and the triggering of shoreline infrastructure requirements

that further affect habitat quality in the Inner Whatcom Waterway. The Alternatives does not restore aquatic habitat within the ASB. The Alternative includes some enhancement of habitat quality offshore of the ASB.

- **Goal 4 (Social & Cultural Uses):** Alternative 3 receives a low ranking under Goal 4 because the dredging plan for the Whatcom Waterway is not consistent with planed mixed-use redevelopment of this area, and because the alternative triggers shoreline infrastructure requirements that are in conflict with area land use and navigation plans. The deep dredging performed under these alternatives results in potential disturbance to cultural or historical resources in the former Citizen's Dock area at the head of Whatcom Waterway. Alternative 3 also does not support planned aquatic reuse of the ASB.
- **Goal 5 (Resource Management):** Alternative 3 receives a medium ranking under Goal 5. Alternative 3 minimizes the use of non-renewable fuel resources required to transport dredged materials off of the waterfront. However, Alternative 3 triggers the creation of new infrastructure that will be costly to create, will produce redundancies with the existing infrastructure present at the Bellingham Shipping Terminal, and will be in conflict with community land use plans for the Inner Whatcom Waterway.
- **Goal 6 (Faster, Better, Cheaper):** Alternative 3 receives a medium ranking under Goal 6. While the costs of the alternative are lower than those of Alternatives 5 and 6, this cost-effectiveness is eliminated after the costs of additional shoreline infrastructure requirements are taken into account. Further, the alternative does not capture new funding sources (i.e., marina revenues) which the Port plans to apply to offset a portion of the cleanup costs under Alternatives 5 through 8.
- **Goal 7 (Economic Vitality, Shoreline Land Use):** Under Goal 7 Alternative 3 receives a low ranking, because the alternative is inconsistent with land use and navigation requirements for either the Whatcom Waterway or for the ASB area. Alternative 3 creates a new fill that will be encumbered by geotechnical and environmental use restrictions.

5.2.5 Alternative 4

Alternative 4 rankings are summarized in Table 5-1. The overall Pilot ranking for Alternative 4 is medium, based on the average of the seven individual rankings. Individual rankings are discussed below:

- **Goals 1 & 2 (Human Health & Safety, Ecological Health):** As with Alternatives 1-3, the Alternative 4 complies with cleanup standards, but

does not use permanent solutions to the maximum extent practicable. This results in medium rankings under Pilot Goals 1 and 2.

- **Goal 3 (Habitat Protection & Restoration):** The ranking against Goal 3 is medium. Alternative 4 preserves and restores some nearshore, shallow-water habitat within the Inner Whatcom Waterway and offshore of the ASB, but the alternative does not provide the extent of habitat restoration provided in Alternatives 5 and 6.
- **Goal 4 (Social & Cultural Uses):** Alternative 4 earns a “medium” ranking under Goal 4. The alternative provides for multiple uses of the Whatcom Waterway consistent with land use and navigation planning, and avoids disturbance of potential historical and cultural resources at the head of the Whatcom Waterway near former Citizen’s dock. However, the alternative does not support planned aquatic reuse of the ASB.
- **Goal 5 (Resource Management):** Alternative 4 receives a medium ranking for Goal 5. Alternative 4 reduces the non-renewable resources consumed during construction activities, and avoids the redundant shoreline infrastructure requirements of alternatives 2 and 3. However, Alternative 4 does not restore productive reuse of the ASB area.
- **Goal 6 (Faster, Better, Cheaper):** Alternative 4 receives a medium ranking for Goal 6. While the alternative can be implemented quickly, and the project is cost-effective, the alternative does not achieve restoration of aquatic uses within the ASB, and does not provide the degree of habitat, navigation and public access enhancements achieved by Alternatives 5 and 6. Further, the alternative does not capture the additional funding source (marina revenues) of these other alternatives.
- **Goal 7 (Economic Vitality, Shoreline Land Use):** Alternative 4 achieves partial consistency with shoreline land use priorities, and receives a “medium” ranking under Pilot Goal 7. The alternative tailors the dredging and shoreline modifications within the Whatcom Waterway to the multi-purpose channel concept. However, the alternative does not restore aquatic uses of the ASB.

5.2.6 Alternative 5

Alternative 5 rankings are summarized in Table 5-1. The overall Pilot ranking for Alternative 5 is high, based on the average of the seven individual rankings. Individual rankings are discussed below:

- **Goals 1 & 2 (Human Health & Safety, Ecological Health):** Cleanup under Alternative 5 is conducted using solutions that are permanent to the maximum extent practicable under MTCA, resulting in high rankings under Goals 1 and 2.

- **Goal 3 (Habitat Protection & Restoration):** Alternative 5 receives a high ranking under Goal 3 because it results in net habitat benefits in the Whatcom Waterway, offshore of the ASB, and within the ASB. Under Alternatives 5 and 6, the ASB is cleaned up and then reconnected to Bellingham Bay. This restores nearly 4,500 linear feet of salmonid migration corridor, and opens approximately 28 acres of open water habitat.
- **Goal 4 (Social & Cultural Uses):** Alternative 5 also ranks high under Goal 4. The alternative enhances social and cultural uses by directly supporting revitalization of the Bellingham waterfront. The cleanup actions within the ASB and the Whatcom Waterway are consistent with and directly support community navigation, land use and habitat enhancement plans, while avoiding potential disruption of cultural and/or archaeological resources that may exist in the former Citizens Dock area at the head of the Whatcom Waterway.
- **Goal 5 (Resource Management):** Alternative 5 receives a “high” ranking under Pilot Goal 5. The alternative uses significant energy resources to accomplish project construction. However, these resources are used appropriately to manage the most heavily-contaminated materials requiring cleanup, and the cleanup action provides for reuse of the clean ASB berm materials. Alternative 5 avoids the creation of redundant shoreline infrastructure (as in Alternatives 2 and 3) that conflicts with area land use priorities. Further, the Alternative supports productive reuse of the ASB.
- **Goal 6 (Faster, Better, Cheaper):** Under Goal 6, Alternative 5 is ranked high because it provides a high-quality cleanup action consistent with planned land uses, while maintaining overall cost-effectiveness. The cleanup actions of Alternative 5 are more costly than Alternatives 1-4, but overall costs are reasonable if mitigation costs and land use impacts are considered as part of the analysis. Additionally, Alternative 5 provides for planned aquatic reuse of the ASB, which is expected to generate additional revenues (marina moorage fees) that help offset the costs of ASB sludge removal.
- **Goal 7 (Economic Vitality, Shoreline Land Use):** Alternative 5 receives a high ranking for Goal 7 by enhancing water-dependent uses of shoreline property, providing for a full range of waterfront uses, and contributing to the revitalization of Bellingham Bay waterfront.

5.2.7 Alternative 6

Alternative 6 rankings are summarized in Table 5-1. The overall Pilot ranking for Alternative 6 is high, based on the average of the seven individual rankings.

Most elements of Alternative 6 are the same as for Alternative 5. The principal difference is that Alternative 6 conducts additional deep dredging adjacent to the Bellingham Shipping Terminal, reducing the area of capping required within Whatcom Waterway. This additional dredging results in some increases to project costs, but with a corresponding potential benefit to future navigation uses at Bellingham Shipping Terminal, should additional navigation depths be required. Therefore, the additional costs of Alternative 6 do not affect rankings of the alternative under Goals 5 (resource management), or under Goal 6 (faster, better, cheaper). Individual rankings are discussed below:

- **Goals 1 & 2 (Human Health & Safety, Ecological Health):** Cleanup under Alternative 6 is conducted using solutions that are permanent to the maximum extent practicable under MTCA, resulting in high rankings under Goals 1 and 2.
- **Goal 3 (Habitat Protection & Restoration):** Alternative 6 receives a high ranking under Goal 3 because it results in net habitat benefits in the Whatcom Waterway, offshore of the ASB, and within the ASB. Under Alternatives 5 and 6, the ASB is cleaned up and then reconnected to Bellingham Bay. This restores nearly 4,500 linear feet of salmonid migration corridor, and opens approximately 28 acres of open water habitat.
- **Goal 4 (Social & Cultural Uses):** Alternative 6 also ranks high under Goal 4. The alternatives enhance social and cultural uses by directly supporting revitalization of the Bellingham waterfront. The cleanup actions within the ASB and the Whatcom Waterway are consistent with and directly support community navigation, land use and habitat enhancement priorities, while avoiding potential disruption of cultural and/or archaeological resources that may exist in the former Citizens Dock area at the head of the Whatcom Waterway.
- **Goal 5 (Resource Management):** Alternative 6 receives a “high” ranking under Pilot Goal 5. The alternative uses significant energy resources to accomplish project construction. However, these resources are used appropriately to manage the most heavily-contaminated materials requiring cleanup. The cleanup action provides for reuse of the clean ASB berm materials, and provides for productive reuse of the ASB. Alternative 6 avoids the creation of redundant shoreline infrastructure that conflicts with area land use priorities in Alternatives 2, 3, 7 and 8.
- **Goal 6 (Faster, Better, Cheaper):** Under Goal 6, Alternative 6 is ranked high because it provides a high-quality cleanup action consistent with planned land uses, while maintaining overall cost-effectiveness. The cleanup actions of Alternative 6 are more costly than Alternatives

1-4, but overall costs are reasonable if mitigation costs and land use impacts are considered as part of the analysis. Additionally, Alternative 6 provides for planned aquatic reuse of the ASB, which is expected to generate additional revenues (marina moorage fees) that help offset the costs of ASB sludge removal.

- **Goal 7 (Economic Vitality, Shoreline Land Use):** Alternative 6 receives a high ranking for Goal 7 by enhancing water-dependent uses of shoreline property, providing for a full range of waterfront uses, and contributing to the revitalization of Bellingham Bay waterfront.

5.2.8 Alternative 7

Alternative 7 rankings are summarized in Table 5-1. The overall Pilot ranking for Alternative 7 is medium, based on the average of the seven individual rankings.

- **Goals 1 & 2 (Human Health & Safety, Ecological Health):** Alternative 7 receives high rankings for Goals 1 and Goal 2, because the level of cleanup meets or exceeds MTCA requirements for use of permanent solutions to the maximum extent practicable. The use of dredging and upland disposal beyond the point considered the maximum extent practicable under MTCA does not affect the rankings against these goals, though it does impact the rankings under Goal 6.
- **Goal 3 (Habitat Protection & Restoration):** Alternative 7 receives a medium ranking under Goal 3. Alternative 7 enhances habitat quality through aquatic reuse of the ASB, and through creation of a cap and habitat bench offshore of the ASB. However, the deep dredging of the 1960s industrial channel removes emergent shallow-water habitat at the head and along the sides of the Inner Whatcom Waterway, and triggers requirements for hardened shoreline infrastructure that further limit habitat quality in this area.
- **Goal 4 (Social & Cultural Uses):** The ranking of Alternatives 7 against Goal 4 is low. The dredging of the 1960s federal channel and the associated requirements for hardened shoreline infrastructure are inconsistent with area land use and navigation planning, and could disturb historical or archaeological resources that may be present near the former Citizen's Dock area.
- **Goal 5 (Resource Management):** Ranking under Goal 5 is low, due to the higher consumption of non-renewable fossil fuel resources during dredging and infrastructure construction, and due to likely redundancy of newly-constructed infrastructure with existing infrastructure at the Bellingham Shipping Terminal.

- **Goal 6 (Faster, Better, Cheaper):** Alternative 7 receives a low ranking for Goal 6, because costs of this alternative are substantially higher than those of Alternative 6, while environmental, land use and habitat benefits are equivalent or lower. This poor cost/benefit relationship is compounded when the costs of required shoreline infrastructure are incorporated into project estimates, and associated land use and environmental impacts are considered.
- **Goal 7 (Economic Vitality, Shoreline Land Use):** Alternative 7 receives a low ranking for Goal 7 due to the poor cost-effectiveness of the alternative, and due to the conflicts between the alternative and planned land uses in the Inner Whatcom Waterway.

5.2.9 Alternative 8

Alternative 8 rankings are summarized in Table 5-1. The overall Pilot ranking for Alternative 8 is low, based on the average of the seven individual rankings.

- **Goals 1 & 2 (Human Health & Safety, Ecological Health):** Alternative 8 receives a low composite ranking relative to the seven Pilot criteria. Rankings for Goal 1 and for Goal 2 were high, because the level of cleanup meets or exceeds MTCA requirements for use of permanent solutions to the maximum extent practicable. However, the use of dredging and upland disposal well beyond the point at which it is considered practicable under MTCA results in a very low rankings for Goal 6 (faster, better, cheaper).
- **Goal 3 (Habitat Protection & Restoration):** Alternative 8 receives a low ranking under Goal 3. Alternative 8 removes emergent shallow-water habitat from the head and sides of the Inner Whatcom Waterway. In addition, Alternative 8 converts shallow-water habitat in portions of Units 5 and 6 to less-productive deep-water habitat, rather than enhancing habitat quality as in preceding alternatives. Despite habitat enhancements conducted within the ASB, this alternative likely results in a net loss of premium nearshore aquatic habitat, resulting in the low ranking under Goal 3.
- **Goal 4 (Social & Cultural Uses):** The ranking of Alternative 8 against Goal 4 is low. The dredging of the 1960s industrial channel and the associated requirements for hardened shoreline infrastructure are inconsistent with area land use and navigation planning in the Inner Whatcom Waterway area. The dredging at the head of the Waterway could disturb historical or archaeological resources that may be present near the former Citizen's Dock area.
- **Goal 5 (Resource Management):** Ranking under Goal 5 is low, because Alternative 8 has the highest consumption of non-renewable

fossil fuel resources during dredging and infrastructure construction, and because the new shoreline infrastructure will likely be redundant with existing infrastructure at the Bellingham Shipping Terminal.

- **Goal 6 (Faster, Better, Cheaper):** Alternative 8 receives a very low ranking for Goal 6 because costs of this alternative are between three and four times higher than the Alternatives 5 and 6, without producing a significant enhancement to site environmental conditions or other benefits. This poor cost-effectiveness is compounded when the costs of required shoreline infrastructure are incorporated into project estimates. The costs of Alternative 8 are well beyond identified funding mechanisms for the project.
- **Goal 7 (Economic Vitality, Shoreline Land Use):** Alternative 8 receives a low ranking for Goal 7 due to the very poor cost-effectiveness of the alternative, and due to the conflicts between the alternative and planned land uses in the Inner Whatcom Waterway. The relatively long restoration time for this Alternative will also hinder community redevelopment activities in waterfront areas.

5.3 Conclusions of Pilot Evaluation

The Pilot analysis of alternatives summarized in Section 5.2 is different from MTCA or SEPA in that it is not required under existing regulatory authorities. Consistency with the Pilot Comprehensive Strategy and the Pilot Goals is voluntary. However, the use of the Pilot goals provides an additional basis by which the qualitative benefits or short-comings of a remedial alternative can be measured.









































































Based on the Pilot evaluation as documented in Table 5-1, the two alternatives that provide the greatest overall benefits are Alternatives 5 and 6. These two alternatives are roughly equivalent to each other. Significant findings from the Pilot evaluation for these and the other alternatives are as follows:

- **No Action Alternative:** The Pilot evaluation resulted in very low rankings for the No Action Alternative. That alternative received low rankings under all seven of the individual Pilot Goals. The Pilot analysis suggests that even in the absence of MTCA and SMS requirements (which prevent use of the No Action Alternative at the site), further consideration of the No Action Alternative is not warranted.
- **Alternative 1:** A low Pilot ranking was also identified for Alternative 1. Alternative 1 received medium rankings for Goals 1, 2 and 3 (Human Health & Safety, Ecological Health and Habitat Protection & Restoration). However, this was offset by low rankings for other Pilot Goals 4 through 7 (Social & Cultural Uses; Resource Management; Faster, Better, Cheaper; and Economic Vitality, Shoreline Land Use).

- **Alternatives 2, 3 & 4:** Alternatives 2, 3 and 4 all ranked medium under the Pilot evaluation. These alternatives all ranked medium for Goals 1 and 2 (Human Health & Safety and for Ecological Health). The alternatives all received medium rankings for Goals 5 and 6 (Resource Management and Faster, Better, Cheaper), reflecting the cost-effectiveness of these alternatives relative to some other project alternatives. Alternatives 2 and 3 ranked low for Goals 4 and 7 (Social & Cultural Uses and Economic Vitality & Shoreline Land Use), because these alternatives conflict with planned land uses both within the Inner Whatcom Waterway and also within the ASB. The greatest differences in rankings between Alternatives 2, 3 and 4 were noted with respect to Goal 3 (Habitat Protection & Restoration). Habitat Protection and Restoration rankings varied from high (Alternative 2) to low (Alternative 3), reflecting the significant differences in net environmental impacts/benefits of these alternatives to fish and wildlife habitat.
- **Alternatives 5 & 6:** Alternatives 5 and 6 received the highest rankings against the Pilot goals. These alternatives received high rankings under each of the seven Pilot Goals. High rankings under Goals 1 and 2 (Human Health & Safety and Ecological Health) were achieved because cleanup is conducted to the maximum extent practicable as defined under MTCA. High rankings under Goal 3 (Habitat Protection and Restoration) were achieved, because these alternatives provide the greatest restoration benefits of any of the project alternatives. The remedies are specifically tailored to planned waterfront land uses, resulting in high rankings for Goals 4 and 7 (Social & Cultural Uses and Economic Vitality & Shoreline Land Uses). High rankings under goals 5 and 6 (Resource Use and Faster, Better Cheaper) apply to Alternatives 5 and 6. While the probable costs of the remedial alternatives are higher than Alternatives 1-4, these costs are proportionate to environmental, habitat and land use benefits achieved under Alternatives 5 and 6. Furthermore, some of the incremental mitigation costs and resource requirements incurred for Alternatives 2 and 3 are avoided. Finally, Alternatives 5 and 6 provide an opportunity to capture additional funding sources (i.e., moorage revenues) to help offset the costs of remediation.
- **Alternatives 7 & 8:** Alternatives 7 and 8 are the two highest-cost alternatives. Alternative 7 was ranked medium against the Pilot Goals, and Alternative 8 was ranked low. Both of these alternatives ranked high for Goals 1 and 2 (Human Health and Safety and Ecological Health), because they conduct cleanup to at least the level considered permanent to the maximum extent practicable under MTCA, as with Alternatives 5 and 6. However, Alternative 7 received only medium rankings for Goal 3 (Habitat Protection and Restoration). Alternative 7 is considered to roughly balance habitat impacts and benefits.

Alternative 8 receives a low ranking under Goal 3, because Alternative 8 appears to produce a net loss of premium nearshore habitat. The two alternatives ranked low for Goals 4 and 7 (Social & Cultural Uses and Economic Vitality, Shoreline Land Use) due to the conflicts between the cleanup alternatives and planned navigation and land uses. Alternatives 7 and 8 received low rankings for Goals 5 and 6 (Resource Management and Faster, Better, Cheaper) because of the disproportionately high costs of the alternatives relative to the environmental, land use and habitat benefits of the alternatives.

Table 5-1. Pilot Comparative Analysis of Project Alternatives

Alternative Number Design Concept Probable Cost (\$Million)	No Action Fig 4-1 \$0	Alt. 1 Fig 4-2 \$8	Alt. 2 Fig 4-3 \$34	Alt. 3 Fig 4-4 \$34	Alt. 4 Fig 4-5 \$21	Alt. 5 Fig 4-6 \$42	Alt. 6 Fig 4-7 \$44	Alt. 7 Fig 4-8 \$74	Alt. 8 Fig 4-9 \$146
Overall Ranking of Alternative Against Pilot Goals	 Low	 Low	 Medium	 Medium	 Medium	 High	 High	 Medium	 Low
Detailed Pilot Comparison of Alternatives									
1 Human Health & Safety	 Low – Action does not comply with MTCA or SMS requirements.	 Medium – Action complies with cleanup levels, but does not use permanent solutions to the maximum extent practicable as defined under MTCA.	 Medium – Action complies with cleanup levels, but does not use permanent solutions to the maximum extent practicable as defined under MTCA.	 Medium – Action complies with cleanup levels, but does not use permanent solutions to the maximum extent practicable as defined under MTCA.	 Medium – Action complies with cleanup levels, but does not use permanent solutions to the maximum extent practicable as defined under MTCA.	 High – Alternative complies with cleanup levels and uses permanent solutions to the maximum extent practicable as defined under MTCA.	 High – Alternative complies with cleanup levels and uses permanent solutions to the maximum extent practicable as defined under MTCA.	 High – Alternative complies with cleanup levels. Removal and upland disposal conducted beyond limits of practicability as defined under MTCA.	 High – Alternative complies with cleanup levels. Removal and upland disposal conducted beyond limits of practicability as defined under MTCA.
2 Ecological Health	 Low – Action does not comply with MTCA or SMS requirements.	 Medium – Action complies with cleanup levels, but does not use permanent solutions to the maximum extent practicable as defined under MTCA.	 Medium – Action complies with cleanup levels, but does not use permanent solutions to the maximum extent practicable as defined under MTCA.	 Medium – Action complies with cleanup levels, but does not use permanent solutions to the maximum extent practicable as defined under MTCA.	 Medium – Action complies with cleanup levels, but does not use permanent solutions to the maximum extent practicable as defined under MTCA.	 High – Alternative complies with cleanup levels and uses permanent solutions to the maximum extent practicable as defined under MTCA.	 High – Alternative complies with cleanup levels and uses permanent solutions to the maximum extent practicable as defined under MTCA.	 High – Alternative complies with cleanup levels. Removal and upland disposal conducted beyond limits of practicability as defined under MTCA.	 High – Alternative complies with cleanup levels. Removal and upland disposal conducted beyond limits of practicability as defined under MTCA.
3 Habitat Protection & Restoration	 Low – Alternative preserves some shallow-water habitats, but does not create new habitat areas. Benefits are offset by lack of completed cleanup and continued risks to environmental receptors.	 Medium – Alternative preserves Inner Waterway habitat areas and creates some new shallow-water habitat offshore of ASB. However, alternative does not facilitate removal of bulkheads or over-water structures in Inner Waterway, nor does it provide for aquatic reuse of ASB.	 High – Cornwall CAD site provides new habitat enhancement. This new habitat is extensive, and offsets habitat losses in the Inner Waterway triggered by dredging of 1960s industrial channel and construction of hardened shoreline infrastructure. However, alternative does not provide for aquatic reuse of ASB.	 Low – Aggressive dredging of 1960s federal channel and requirements for hardened shoreline infrastructure remove existing nearshore habitat from the Inner Waterway, conflicting with habitat enhancement opportunities . Alternative represents net loss of premium nearshore habitat. Nearshore fill in ASB precludes aquatic restoration of ASB area.	 Medium – Multi-purpose channel concept for Inner Waterway preserves and enhances nearshore habitat along salmon migration corridors, and nearshore habitat is enhanced as part of capping of Unit 5-B. But ASB sludges remain in place and preclude aquatic restoration of ASB area. Habitat benefits are less than under Alternatives 5 and 6.	 High – Remedy produces net habitat benefits in the Inner Waterway, offshore of the ASB, and within the ASB. Nearshore habitat at head and along sides of Inner Waterway is enhanced. Unnecessary habitat impacts are avoided by integration of cleanup and reuse planning for waterfront. Approximately 4-6 acres of premium nearshore habitat is developed as part of capping of Unit 5-B. Remedy restores aquatic use of the ASB, providing 28 acres of aquatic habitat and nearly 4,500 linear feet of nearshore habitat along salmonid migration corridors.	 High – Remedy produces net habitat benefits in the Inner Waterway, offshore of the ASB, and within the ASB. Nearshore habitat at head and along sides of Inner Waterway is enhanced. Unnecessary habitat impacts are avoided by integration of cleanup and reuse planning for waterfront. Approximately 4-6 acres of premium nearshore habitat is developed as part of capping of Unit 5-B. Remedy restores aquatic use of the ASB, providing 28 acres of aquatic habitat and nearly 4,500 linear feet of nearshore habitat along salmonid migration corridors.	 Medium – Aggressive dredging of 1960s industrial channel removes existing nearshore habitat and requires new shoreline infrastructure conflicting with habitat enhancement opportunities in Inner Waterway. These habitat losses are offset by restoration of aquatic uses in the ASB and development of a cap and habitat bench offshore of ASB. Federal channel configuration may require use of sub-optimal access channel location for ASB marina, further restricting potential habitat gains.	 Low – Aggressive dredging of 1960s industrial channel removes existing nearshore habitat and requires new shoreline infrastructure conflicting with habitat enhancement opportunities in Inner Waterway. These habitat losses are compounded by adverse habitat changes associated with dredging of nearshore habitat in multiple areas. Federal channel configuration may require use of sub-optimal access channel location for ASB marina, further restricting potential habitat gains. Habitat gains associated with aquatic reuse of ASB will not likely offset habitat impacts.
4 Social & Cultural Uses	 Low – Alternative does not support cleanup and revitalization of the Bellingham waterfront.	 Low – Alternative does not support community land use and navigation priorities for Whatcom Waterway areas. Does not provide for aquatic reuse of ASB.	 Low – Dredging of 1960s industrial channel and associated requirements for hardened shoreline infrastructure in Inner Waterway are inconsistent with planned land and navigation uses in this area. Dredging may disturb archaeological or historical resources in the Citizen's Dock area. Alternative does not support planned aquatic reuse of the ASB.	 Low – Dredging of 1960s industrial channel and associated requirements for hardened shoreline infrastructure in Inner Waterway are inconsistent with planned land and navigation uses in this area. Dredging may disturb archaeological or historical resources in the Citizen's Dock area. Alternative does not support planned aquatic reuse of the ASB.	 Medium – Alternative supports some of the community waterfront revitalization efforts. Provides for multiple uses of the Whatcom Waterway, from public shoreline access and transient moorage to deep draft navigation. However, does not provides for aquatic reuse of the ASB. Does not disturb potential historical or archaeological resources near Citizens Dock area.	 High – Alternative directly supports waterfront revitalization efforts. Provides for multiple uses of the Whatcom Waterway, from public shoreline access and transient moorage to deep draft navigation. Provides for planned aquatic reuse of the ASB for integrated navigation, public access and habitat enhancement improvements. Alternative avoids impacts to potential historical or archaeological resources near the Citizens Dock area.	 High – Alternative directly supports waterfront revitalization efforts. Provides for multiple uses of the Whatcom Waterway, from public shoreline access and transient moorage to deep draft navigation. Provides for planned aquatic reuse of the ASB for integrated navigation, public access and habitat enhancement improvements. Alternative avoids impacts to potential historical or archaeological resources near the Citizens Dock area.	 Low – Dredging of 1960s industrial channel and associated requirements for hardened shoreline infrastructure are inconsistent with land use and navigation planning for the Inner Waterway. New shoreline infrastructure likely redundant with existing infrastructure at BST. Dredging may disturb potential historical or archaeological resources in former Citizens dock area.	 Low – Dredging of 1960s industrial channel and associated requirements for hardened shoreline infrastructure are inconsistent with land use and navigation planning for the Inner Waterway. New shoreline infrastructure likely redundant with existing infrastructure at BST. Dredging may disturb potential historical or archaeological resources in former Citizens dock area. Long project restoration time-frame will hamper community redevelopment.
5 Resource Management	 Low – Alternative provides only short-term cost savings. Long-term needs of community and environment are not addressed.	 Low – Alternative provides short-term cost savings and minimization of resource use. However, alternative impedes continued use of deep draft navigation infrastructure at the Bellingham Shipping Terminal.	 Medium – Alternative provides cost-effective management for dredged materials and minimizes the use of resources otherwise needed to transport dredge materials off of the waterfront. However, the costly new industrial infrastructure required to stabilize shorelines in the Inner Waterway is inconsistent with planned land uses, and will produce redundancies with existing BST infrastructure.	 Medium – Alternative provides cost-effective management for dredged materials and minimizes the use of resources otherwise needed to transport dredge materials off of the waterfront. However, the costly new industrial infrastructure required to stabilize shorelines in the Inner Waterway is inconsistent with planned land uses, and will produce redundancies with existing BST infrastructure.	 Medium – Alternative has relatively low construction costs and resource demands. Alternative also avoids new redundant infrastructure requirements of Alternatives 2, 3, 7 and 8. Alternative prevents aquatic reuse of ASB area.	 High – Alternative provides good balance between expended costs/resources for construction, and project benefits. Updating of channel dimensions provides for multiple uses in Inner Waterway area, consistent with planned mixed-use redevelopment of this area. Preserves deep draft navigation capabilities at Bellingham Shipping Terminal using existing infrastructure. Avoids new redundant infrastructure requirements of Alternatives 2, 3, 7 and 8. Allows reuse of clean ASB berm materials through remediation of ASB.	 High – Alternative provides good balance between expended costs/resources for construction, and project benefits. Updating of channel dimensions provides for multiple uses in Inner Waterway area, consistent with planned mixed-use redevelopment of this area. Preserves deep draft navigation capabilities at Bellingham Shipping Terminal using existing infrastructure. Avoids new redundant infrastructure requirements of Alternatives 2, 3, 7 and 8. Allows reuse of clean ASB berm materials through remediation of ASB.	 Low – Costs and resource use of Alternative 7 are substantially higher than Alternative 6, and benefits are not proportionate to additional costs. Deep dredging of 1960s industrial channel requires creation of substantial new infrastructure that is inconsistent with planned mixed-use redevelopment of Inner Waterway area. New infrastructure is redundant with existing BST infrastructure.	 Low – Costs and resource use of Alternative 8 are nearly four times higher than Alternative 6, and benefits are not proportionate to additional costs. Deep dredging of 1960s industrial channel requires creation of substantial new infrastructure that is inconsistent with planned mixed-use redevelopment of Inner Waterway area. New infrastructure is redundant with existing BST infrastructure.
6 Faster, Better, Cheaper	 Low – Alternative does not address site cleanup requirements and provides lower benefits under other goals.	 Low – Alternative is fast and inexpensive, but does not provide the waterfront land use and navigation benefits of other alternatives.	 Medium – Alternative is similar in cost to the preferred alternatives. However, additional costs of required shoreline infrastructure in Inner Waterway offset remedy cost-effectiveness. Alternative does not capture new funding sources (i.e., marina revenues) which the Port plans to use to offset a portion of cleanup costs under Alt. 5-8.	 Medium – Alternative is similar in cost to the preferred alternatives. However, additional costs of required shoreline infrastructure in Inner Waterway offset remedy cost-effectiveness. Alternative does not capture new funding sources (i.e., marina revenues) which the Port plans to use to offset a portion of cleanup costs under Alt. 5-8.	 Medium – Remedy can be implemented quickly and is cost-effectively. However, alternative does not provide the degree of habitat, land use and navigation benefit as the preferred alternatives. Does not capture additional funding sources (i.e., marina revenues) which the Port plans to use to offset a portion of the cleanup costs under Alt. 5-8.	 High – Remedy is more costly than Alternatives 1-4, but incremental cleanup costs are offset by additional project benefits. Overall costs, including mitigation costs and infrastructure requirements, are lower than Alternatives 2 and 3, and environmental and land use benefits are greater than in Alternative 4. By supporting aquatic reuse of ASB, Alternative also provides for capture of additional funding sources (i.e., marina revenues) which the Port plans to use to offset a portion of the cleanup costs.	 High – Remedy is more costly than Alternatives 1-4, but incremental cleanup costs are offset by additional project benefits. Overall costs, including mitigation costs and infrastructure requirements, are lower than Alternatives 2 and 3, and environmental and land use benefits are greater than in Alternative 4. By supporting aquatic reuse of ASB, Alternative also provides for capture of additional funding sources (i.e., marina revenues) which the Port plans to use to offset a portion of the cleanup costs. Additional costs relative to Alternative 5 increase depth flexibility at Bellingham Shipping Terminal.	 Low – Costs of Alternative 7 are substantially higher than Alternative 6, and benefits are not proportionate to additional costs. Deep dredging of 1960s industrial channel requires creation of substantial new infrastructure that is inconsistent with planned mixed-use redevelopment of Inner Waterway area. Costs of new infrastructure compound the poor cost-effectiveness of the remedy. Aquatic reuse of ASB captures some additional funding (i.e., marina revenues), but project costs are well in excess of defined funding plans.	 Very Low – Costs of Alternative 8 are almost 4 times higher than Alternative 6, and benefits are not proportionate to additional costs. Deep dredging of 1960s industrial channel requires creation of substantial new infrastructure that is inconsistent with planned mixed-use redevelopment of Inner Waterway area. Costs of new infrastructure compound the poor cost-effectiveness of the remedy. Despite capture of additional funding source (i.e., marina revenues) through aquatic reuse of ASB, costs of project dramatically exceed defined project funding plans.
7 Economic Vitality, Shoreline Land Use	 Low – Alternative does not achieve cleanup, and restrictions on use of Waterway and ASB interfere with land use and habitat objectives.	 Low – Use restrictions on Waterway are not consistent with planned land or navigation uses. Alternative is not consistent with planned aquatic reuse of the ASB.	 Low – Deep dredging of 1960s industrial channel and associated requirements for hardened shoreline infrastructure produces conflicts with planned mixed-use redevelopment of Inner Waterway. Alternative does not provide for aquatic reuse of the ASB.	 Low – Deep dredging of 1960s industrial channel and associated requirements for hardened shoreline infrastructure produces conflicts with planned mixed-use redevelopment of Inner Waterway. Alternative does not provide for aquatic reuse of the ASB. Value of new fill area within ASB will by limited by use restrictions associated with geotechnical and environmental use restrictions.	 Medium – Alternative directly supports waterfront revitalization and community land use, navigation, public access and habitat enhancement priorities for Inner Waterway area. Dredging and shoreline stabilization activities directly support these objectives. However, alternative does not provide for aquatic reuse of the ASB area.	 High – Alternative directly supports waterfront revitalization efforts, providing for a full range of waterfront uses. Inner Waterway dredging and shoreline stabilization activities directly support area redevelopment objectives. Alternative restores ASB to aquatic uses. Project has defined funding plan.	 High – Alternative directly supports waterfront revitalization efforts, providing for a full range of waterfront uses. Inner Waterway dredging and shoreline stabilization activities directly support area redevelopment objectives. Alternative restores ASB to aquatic uses. Project has defined funding plan.	 Low – Dredging plan for Inner Waterway and associated requirements for hardened shoreline infrastructure are inconsistent with planned land and navigation uses in this area. Alternative does restore ASB to aquatic uses. However, costs of cleanup project and associated infrastructure requirements substantially exceed project funding plan.	 Low – Dredging plan for Inner Waterway and associated requirements for hardened shoreline infrastructure are inconsistent with planned land and navigation uses in this area. Alternative does restore ASB to aquatic uses. However, costs of cleanup project and associated infrastructure requirements substantially exceed project funding plan. Long project restoration time will hamper community redevelopment.

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